

electrical phenomena and effects, will find its pages perfectly intelligible.

THE first part of Dr. Carl Chun's narrative of the cruise of the *Valdivia* and the scientific work accomplished, which has been published by the firm of Gustav Fischer, Jena, shows that the complete work, "Aus den Tiefen des Weltmeeres," will be a most interesting account of a successful expedition. The descriptive matter is untechnical in style, and liberally illustrated with excellent half-tone blocks and plates reproduced from photographs. The complete work will contain six chromolithographs, eight heliogravures, thirty-two full-page plates, and about 180 illustrations in the text. There will be twelve parts in all, two of which will be published every month, and the whole by November next. The work will be a *Challenger* narrative on a small scale, full of interest to all students of natural history and of physical geography in the most comprehensive sense of the term. We propose to review it in detail when all the parts have been received.

PROF. E. B. WILSON'S work on "The Cell in Development and Inheritance" (The Macmillan Company) contains a masterly treatment of the facts of cell-structure and division, and is favourably known to many biologists. It originally appeared in 1896, and has already been reviewed in *NATURE* (vol. lv. p. 530). Since then the aspect of many important questions with which it deals has been greatly changed, more particularly in case of those focused in the centrosome, and involving the phenomena of cell-division and fertilisation. This has necessitated a complete revision of the work, and there is scarcely a page of the second edition, which has just been published, that has not undergone alteration. More than a hundred pages of new matter have also been added. The most important results of modern cell-research, especially on the zoological side, are brought together in the volume, which will continue to be used as a convenient and clear synopsis of a vast amount of knowledge to which additions are constantly being made.

THE additions to the Zoological Society's Gardens during the past week include a Grivet Monkey (*Cercopithecus griseo-viridis*) from North-east Africa, presented by Mr. H. G. F. Stallard; a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, presented by Miss E. B. Hall; two Palm Squirrels (*Sciurus palmarum*) from India, presented by Mr. W. B. Bingham; two Common Squirrels (*Sciurus vulgaris*), British, presented respectively by Dr. J. L. Williams and Mr. G. S. Johnson; an Egyptian Jerboa (*Dipus aegyptius*) from North Africa, presented by Lady Preston; an Angola Seed-eater (*Serinus angolensis*) from Angola, presented by Miss Long; a Yellow-billed Sheathbill (*Chionis alba*), captured at sea, presented by Captain Bate; ten African Walking Fish (*Periophthalmus kœlreuteri*) from West Africa, presented by Dr. H. O. Forbes; a Hocheur Monkey (*Cercopithecus nictitans*), a Moustache Monkey (*Cercopithecus cephus*), a Malbrouck Monkey (*Cercopithecus cynosurus*), an Angolan Vulture (*Gypohierax angolensis*) from West Africa, a Chacma Baboon (*Cynocephalus torquatus*, ♂) from South Africa, a Negro Tamarin (*Midas ursulus*) from Guiana, two Wandering Tree Ducks (*Dendrocygna arcuata*) from the East Indies, four Anderson's Tree Frogs (*Hyla andersoni*), four Changeable Tree Frogs (*Hyla versicolor*) from North America, deposited; an Orinoco Goose (*Chenalopex jubatus*), a Blue-fronted Amazon (*Chrysotis aestiva*, var.) from South America, a Little Guan (*Ortalia motmot*) from Guiana, a De Filippi's Meadow Starling (*Sturnella defilippi*) from Argentina, purchased; two Collared Fruit Bats (*Cynonycteris collaris*) from South Africa, received in exchange; three White Ibises (*Eudocimus albus*), six Glossy Ibises (*Plegadis falcinellus*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

FRENCH OBSERVATIONS OF THE TOTAL ECLIPSE OF THE SUN.—The *Comptes rendus* of the Paris Academy of Sciences for June 5 (vol. cxxx. pp. 1495-1529) contains the preliminary reports of several of the French astronomers who made observations of the recent total eclipse.

M. le Comte de la Baume-Pluvinel, observing at Elche, near the east coast of Spain, successfully carried out a very extensive programme. Nine photographs of the corona were obtained with objectives of 1.50 metres focal length; on these he says the coronal structure is almost identical with that he observed in 1889 at Salut. The planet Mercury is shown on all these plates, and will be useful for their accurate orientation. Three plates were obtained with a lens of 2.70 metres focal length, in conjunction with a cœlost. For spectroscopic work three instruments were employed. A single prism spectrograph, with the slit in the line of the solar equator, showed the continuous spectrum of the corona extending to 12' from the limb. Thirty-five bright lines were recorded, more intense on one side than the other. A second spectrograph had two objective prisms of spar and quartz; plates taken with this showed numerous chromospheric arcs, and a strong one due to the corona, this latter having no definite outer boundary. One interesting plate taken some seconds after totality still shows chromospheric arcs, and will furnish measures of the thickness of the chromospheric layers from the actual limb of the sun. An attempt to observe with a powerful six-prism spectroscope for special examination of the principal coronal radiation was rendered difficult by the feeble intensity of the image.

M. Ch. Trépied, director of the Algiers Observatory, also communicates a number of successful results. In addition to many accurate visual observations, twenty-eight photographs of the partial phases were made; six of the corona during totality, using an objective of 0.16 metre aperture and 1.03 metre focal length; the coronal extensions are recorded to 3.5 lunar diameters from the limb. Spectroscopic photographs were obtained with a Thollon prism spectrograph, an attempt being made to record the spectrum of the corona at diametrically opposite regions.

M. G. Meslin and party at Elche obtained eight photographs of the corona with a Henry lens of 16cm. aperture and 1 metre focus, and wide angle photographs of the region round the eclipsed sun for recording new objects. A photograph of the spectrum of the corona was obtained with a concave Rowland grating of 3 metres radius of curvature, used with a heliostat. The second order was photographed on plates 13 × 18cm., the spectrum extending from F to M; the images of the chromospheric radiations being portions of circles 16mm. in diameter.

THE TOTAL ECLIPSE OBSERVED AT SEA.—In an interesting letter written to the *Gibraltar Chronicle* of May 30, Colonel E. E. Markwick describes the appearance of the recent total eclipse as he and other fortunate passengers observed it from the Orient Steamship Company's R.M.S. *Austral*. The Company had considerably arranged that the vessel should be so navigated as to be near the central line of totality at the time of the eclipse, and, thanks to the skill of those in charge, this was accomplished with perfect success.

The position of the ship during totality was about Long. W., 9° 27', Lat. N., 41° 3', this being about 50 miles west of Oporto; the duration of the eclipse was about 1m. 31s. The Orient Company had provided an ample supply of glass plates, which, when smoked, permitted the passengers to view the progress of the partial phases, opera glasses being substituted during totality. During the eclipse the sky near the horizon was a lurid yellow, the clouds visible being reddish; the sea looked dark and sombre against the bright yellow of the sky. Close to the sun, however, the sky was quite blue; the darkness during totality was just sufficient to interfere with distinct vision.

The success of this enterprising project will probably induce many would-be observers in the future to adopt this exceedingly convenient and comfortable style of eclipse expedition; the departure from regular routine, though slight in itself, furnishing opportunity for really important scientific operations without disorganising any of the usual arrangements of the observers.

NEW VARIABLE STAR IN CEPHEUS.—Prof. W. Ceraski, of Moscow, announces in the *Astronomische Nachrichten* (No. 3644) that Mdme. Ceraski has found a new variable on examin-

ation of plates taken by M. Blajko. The star is not in the D.M., and has the following position:—

R.A. oh. 28m. } 1855.
Decl. + 79° 33'

The brightness varies from between 8.9 to about 12 magnitude. It was increasing in October 1896, and decreasing in October 1897; it was almost at minimum during May 1898, April 1899, and at commencement of May 1900.

EPHEMERIS OF EROS.—Herr F. Ristenpart communicates a revised ephemeris of this planet to the *Astronomische Nachrichten* (Bd. 152, No. 3643), as follows:—

Ephemeris for 12h. Berlin Mean Time.

1900.	R.A.		Decl.	
	h.	m. s.	°	' "
June 21 ...	0	30 15.44 ...	+ 9	57 27.1
23 ...		33 42.19 ...	10	33 33.6
25 ...		37 8.20 ...	11	9 49.0
27 ...		40 33.44 ...	11	46 13.3
29 ...		43 57.91 ...	12	22 46.6
July 1 ...		47 21.57 ...	12	59 29.0
3 ...		50 44.44 ...	13	36 21.0
5 ...	0	54 6.51 ...	+ 14	13 22.3

HOWE'S PHOTOGRAPHIC OBSERVATION OF EROS.—Mr. A. C. D. Crommelin writes to point out an error in our note on the above, in which it was incorrectly stated that Prof. Howe's photographic observation of Eros was obtained during the solar eclipse of May 28. The photograph was taken before sunrise on the morning of the eclipse, some hours before totality. The error was introduced by the report of the observation being included in reports of the eclipse, and if uncorrected might lead to wrong estimates of the comparative brightness of the planet and of the darkness of the sky during totality.

A MODERN UNIVERSITY.

I.

THE granting of a Charter to the University of Birmingham, which has just become an accomplished fact, forms a fitting climax to an educational movement which may turn out to be one of the most momentous of the century. We have seen University Colleges called into existence in the great cities of the land by the perception of leading citizens that culture and scientific education of a high type must be brought to their doors and made accessible to all; and we have seen the chairs of those colleges occupied by men who have devoted their spare time to the advancement of learning in various ways. All this has been of the greatest interest in the past and is full of hope for the future.

Side by side with these colleges there is now growing up in many cities a Technical School generally under Municipal Government, wherein artisans and hand workers generally may be trained in their craft, and in the main principles underlying it, in a more direct and satisfactory manner than by the old system of apprenticeship.

Such schools can no more turn out a finished artisan than the colleges can turn out a finished scholar. Much remains to be learned in later life and in the actual pursuit of trade or profession, but the early stages are overcome not only more rapidly, but far more thoroughly, by aid of direct instruction; and in the more favourable cases a substratum of scientific knowledge is laid, and a grasp of principle attained, which must be of the utmost benefit hereafter, and could never have been obtained on the old plan. It is this scientific training in principles which is the really needful thing, when the public is educated enough to perceive it; it is this which is of interest to the educationist, and not a mere instruction in handicraft: it is the making of men, and not the making of machines, which is of vital importance to the future of a country.

Without a training in principles a man remains ignorant and narrow, limited to the performance of the one thing which he has been trained to do, and incapable of turning his attention profitably to anything else; inelastic and incapable of devising or of assimilating modifications and developments, which, as they come in, tend to leave him stranded and belated, waiting only for a period of slacker demand to throw him out of employment. And even if the artisan and the foreman are well educated, there remains his employer to be considered. If he is ignorant—too ignorant to turn his enterprise in the right direction when oppor-

tunity offers—his workers must suffer, and the whole nation suffers with them. But though Colleges and Technical Schools impart education on the one hand and instruction on the other; though they enlarge and make more real the education available to the average citizen, they do not control and modify the educational ideal of the country. That ideal remains in many respects still essentially the same as it was at the beginning of the present century, before all this amazing inrush of new knowledge. The new knowledge has not yet been incorporated into education. The half-hearted effort made by schools to introduce what they term a "modern side" only serves to emphasise the blankness of the prospect. They say, and say truly, no doubt, that the new studies do not answer. They do not pay either for Government appointments or for the university. But a new university, able to set its own standards, select its own faculties, and set its seal on students of its own subjects, has far larger possibilities before it. It can control, and not only impart, education. It may need an effort to rise to its privileges. The easiest plan is to follow the lead of others and establish degrees on the worn old lines, but that is not what we expect and hope from the new university of the Midlands. We hope to see it break away from mediæval traditions and realise the need there is for a new educational ideal.

The aim we have before us is an aim at actualities rather than at artificialities; at real things rather than at conventions.

There is a stage of thoroughness at which a study of the conventionalities of grammar and orthography is able to convey real information about men and things—the advanced stage when it becomes the science of philology—but as usually learnt by ordinary persons it is little better than a conventional code and set of rules. If there was little in the world to learn about—as in the middle ages there was but little—it might be well to spend much time in acquiring precisely the gender of nouns and the terminations of irregular verbs in different foreign tongues; not only for practical purposes but for mental training; but amid the superfluity of real subjects of the present day, of all of which the ordinary person is densely ignorant, to immerse him for a long period in these barren studies is wasteful of his youth.

On the other hand, History is reality; and some knowledge of history is necessary for every one. Art, again, and Literature and Music are, or may be, realities; and the vast majority who have no power of creation should at least learn reverently to appreciate the great work of the greatest masters in all subjects, unless they are deaf and dumb and blind. The things really valuable to the human race should be made in some degree accessible to all, and this part of the work of education the Press and the Stage indirectly in some degree accomplish; imperfectly, no doubt, but often more really than do the bodies which make the attempt in a more academic way.

Thus we would discriminate between the conventionalities of language and the realities of literature, just as we discriminate between the laws of colour and perspective, the technique of the painter on the one hand—and the great work of art itself, the expression of a thought or of an emotion, or of a beauty or of a fact. To the scholar, as to the painter, the two are inextricably interwoven; technique is the material in which he works; but the general human race, who have to do the work of the world, and who constitute the bulk of the nation, are neither scholarly nor artistic, and it is both wasteful and cruel to plunge them into technique, and disgust them with the—to them—dull and meaningless details, instead of educating them in the finished work possible only to masters of the craft.

The same sort of things do we say of science and of mathematics. Here, again, there is too great a tendency to educate youths in subtleties and artifices and minutiae, as if they were going all to be accomplished mathematicians or men of science. The teacher is himself, perhaps, a mathematician, and so thinks that what was necessary for him is suitable for everybody. More usually, of course, the teacher knows very little about it, and feels only that he was himself taught that way, and that he must pass it on. Only a few stop to think what they are doing, and these are the educationists; what they have to say is written at large, and there is no need to repeat it. Some of them are faddists, doubtless; not all are wise; but it is well at any rate to try and think a matter out; and the speculative teaching even of a faddist is likely to be more stimulating than the tenth-hand droning of a conventional pedagogue. To indicate our meaning in terms of mathematics and science, as we have tried briefly to indicate it in the domain of more humanistic studies, we would say that a good deal of the teaching of Euclid